REMARKS

This communication responds to the Office Action of January 7, 2009, in which claims 1-15 are pending. In the Office Action, claim 1 was rejected under 35 U.S.C. § 112, paragraph 2, claims 1-13 were rejected under 35 U.S.C. § 101, and claims 1-15 were rejected under 35 U.S.C. § 103(a). Additionally, paragraph 29 of the specification was objected to as non-compliant with M.P.E.P. § 608.01, and the title was objected to as insufficiently descriptive. Applicants have carefully considered the Examiner's remarks in the Office Action, and in response have provided amendments to the title, the specification, and to claim 1. No new matter has been added. In light of the aforementioned amendments, and the remarks provided below in connection therewith, Applicants respectfully submit that all of the Examiner's objections/rejections have been overcome, and that the pending claims now stand in allowable form. Reconsideration and allowance are thus requested.

Claim Rejections Under 35 U.S.C. §101

Claims 1-13 were rejected under 35 U.S.C. § 101 because the claimed invention is drawn to non-statutory subject matter. Applicants traverse this rejection for at least the following reasons.

In framing his rejection, the Examiner states that the instant claims "neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process" *Current Office Action, p. 3.* The Examiner continues by explaining: "In order for a process to be tied to another statutory category, the structure of another statutory category must be positively recited in a step or steps significant to the basic inventive concept, and not just in association with statements of intended use or purpose, insignificant pre- or post-solution activity, or implicitly." *Current Office Action, p. 3-4.*

The Applicants respectfully submit that the Examiner has mistakenly construed either the claims or legal precedent. More specifically, claims 1-13 are drawn to statutory subject matter according to Federal Circuit precedent, including the recent case *In re Bilski.* At page 25-26 of the Federal Circuit's opinion in *In re Bilski* (545 F.3d 943, 962–63 (Fed. Cir. 2008)), the Court

favorably discusses the case *In re Abele* (684 F.2d 902 (C.C.P.A. 1982)). *In re Abele* involved claims concerning the same field of technology as in the instant application—computerized processing of medical images—and is thus particularly relevant to the patentability of Applicants' pending claims. Commenting on the *Abele* opinion, the *Bilski* Court stated as follows:

> [The claimed] data clearly represents physical and tangible objects, namely the structure of bones, organs, and other body tissues. Thus, the transformation of that raw data into a particular visual depiction of a physical object on a display was sufficient to render [the claimed process] patent-eligible. We further note for clarity that the electronic transformation of the data itself into a visual depiction in Abele was sufficient; the claim was not required to involve any transformation of the underlying physical object that the data represented. We believe this is faithful to the concern the Supreme Court articulated as the basis for the machine-or-transformation test, namely the prevention of pre-emption of fundamental principles. So long as the claimed process is limited to a practical application of a fundamental principle to transform specific data, and the claim is limited to a visual depiction that represents specific physical objects or substances, there is no danger that the scope of the claim would wholly pre-empt all uses of the principle.

Bilski, 545 F.3d at 962-63 (citing *Abele*, 684 F.2d at 908–09).

Just as in *Abele*, the claimed "series of digital images" in the instant application "represent physical and tangible objects." Furthermore, the pending claims "transform" this data into a compressed state for storage, and then "reconstruct" the compressed images for later display. Additionally, just as in *Abele*, the claimed processes are "limited to a practical application of a fundamental principle to transform specific data" . . . "represent[ing] specific physical objects or substances," and no fundamental principles are preempted.

Thus, based on the Federal Circuit's recent reaffirmation of the patentability of claims within the same field of technology as the claims of the instant application, Applicants respectfully submit that claims 1-13 recite patent-eligible subject matter. Withdrawal of the rejection of the claims under 35 U.S.C. 101 is respectfully requested.

Claim Rejections Under 35 U.S.C. §112

Claim 1 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicants have provided an amendment to claim 1, according to the Examiner's comments at paragraph 3 of the Office Action, which addresses the Examiner's rejection. Withdrawal of the rejection is therefore respectfully requested.

Claim Rejections Under 35 U.S.C. §103

Claims 1-15 were rejected under 35 U.S.C. § 103(a) as being obvious in view of various combinations of the Examiner's cited references, each of which will be discussed in detail below. Applicants traverse each of these rejections, and respectfully submit that the application stands in allowable form.

Claims 1-3 and 6

Claims 1-3 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Thomson (U.S. Patent No. 3,921,204) and further in view of Girod et al. "A subjective evaluation of noise-shaping quantization for adaptive intra-/interframe DPCM coding of color television signals." IEEE Transactions of Communications, vol. 36, issue 3, pp.332-346 (March 1988).

Claim 1 is directed to "A method of compressing a series of digital images." Claim 1 comprises, in part, "subtracting the value of each pixel of each of images 2 to n from its corresponding pixel in an adjacent image to form subtracted images 2 to n; adjusting the pixel value to zero for pixels of each of subtracted images 2 to n having absolute values of less than a predetermined threshold value; and compressing said subtracted images of said series 1 to n using a compression algorithm to form compressed images . . . ." The Examiner asserts that Thomson teaches the above-recited claim limitations. Applicants respectfully disagree.

Thompson is directed to methods of encoding in digital form an analogue signal including a modulated sub-carrier wave, such as a color television video signal, in which

sampling of the analogue signal is a simple factor (e.g., 3) times the frequency of the sub-carrier wave. The disclosed encoding methods include comparing the instantaneous value of the analogue signal with a previously occurring value, which is spaced by one or more cycles of the sub-carrier f4rom the instantaneous value, and then encoding the difference between the two values.

Understanding the methods of Thompson, and how they differ significantly from the instant application, requires and understanding of sub-carrier waves—e.g., analog television signals. An analog television signal is nothing more than a continuous series of electrically generated waves at a specific frequency. The frequency depends on the channel, e.g., channel 2 has an assigned frequency, channel 3 has a higher assigned frequency, etc. The amplitude of each successive wave (or cycle) in the signal corresponds to the color of a specific pixel on a television set. These colors are translated from the signal to the television screen via a progressive-scan electron beam. Progressive scan means that the electron beam starts at the first pixel on the television (which is the upper-most right-hand corner of most televisions), sends the appropriate electron beam to illuminate that first pixel at the proper color, and then moves on to the second pixel, sends an electron beam to illuminate that second pixel at the proper color, and so on. Again, each wave (or cycle) of the sub-carrier signal corresponds to one pixel. Thus, consecutive waves (cycles) correspond to adjacent pixels on the same image, not the same pixel on a subsequent images. The sub-carrier signal provides enough waves (cycles) to progressively scan each pixel on the entire television screen in, typically, $1/58^{th}$ of a second; at which point the scan begins a new with pixel 1, starting a new image. This process is fast enough that the human eye is only able to discern what appears to be continuous motion / illumination of the television screen.

With this in mind, the teachings of Thompson become clear. Thompson discloses sampling the sub-carrier wave at a factor of the frequency, e.g., 3. This means that every third pixel on the same image is sampled, not the same pixel from every third image in a series of images. Thompson further discloses subtracting the value of each sample from the previous. Intuitively, this makes sense, because on any single television image, one would expect that pixels adjacent to each other or near each other will likely be the same or similar in color; thus, subtracting the color value provides an effective means to "zero-out" many of these pixels for

storage / compression purposes. Figures 6-9 of Thompson confirm this understanding, wherein every third adjacent pixel on a single image is sampled (demarcated with an "X" and shaded), and then subtracted / compressed. Thus, Thompson does not in any way disclose "subtracting the value of each pixel of each of images 2 to n from its corresponding pixel in an adjacent image to form subtracted images 2 to n; adjusting the pixel value to zero for pixels of each of subtracted images 2 to n having absolute values of less than a predetermined threshold value; and compressing said subtracted images of said series 1 to n using a compression algorithm to form compressed images" as claimed.

Girod does not remedy the deficiencies of Thompson. Girod discloses predictive methods for quantizing and reducing "noise" in the digital coding of color television signals. Particularly, Girod relates to methods to reduce reconstruction errors when television signals are reconstructed from a compression or digitization achieved, for example, according to methods similar to those disclosed in Thompson. Girod teaches predictive methodologies, wherein the value of an adjacent pixel, or the corresponding pixel on subsequent images may be predicted based on the disclosed algorithms for improved accuracy in the conversion / compression from analog to digital in methods similar to those disclosed in Thompson. These predictions are particularly helpful in the sampling of television signals where motion is rapid or where the image is complex. That is, where the change between adjacent pixels is large, errors tend to accumulate, and the ability to provide a corrective prediction is beneficial. Nowhere, however, does Girod disclose, either alone or when viewed in combination with Thompson, "arranging said images in an ordered series from 1 to n wherein n is the last image in said series; subtracting the value of each pixel of each of images 2 to n from its corresponding pixel in an adjacent image to form subtracted images 2 to n; adjusting the pixel value to zero for pixels of each of subtracted images 2 to n having absolute values of less than a predetermined threshold value; and compressing said subtracted images of said series 1 to n using a compression algorithm to form compressed images" as claimed.

Claims 2, 3 and 6 depend from, and incorporate all the limitations of, claim 1, and are therefore not obvious in view of Thompson and Girod for the same reasons as detailed above.

Claims 4 and 5

Claims 4 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Thomson and Girod as applied to claim 1 above, and further in view of Kwon (U.S. Patent No. 4,745,465).

Claims 4 and 5 depend from, and incorporate all the limitations of, claim 1, and are therefore not obvious in view of Thompson and Girod for the same reasons as detailed above. Furthermore, Kwon does not remedy the deficiencies of Thompson and Girod. Kwon discloses a digital color image processing method including generating color reproduction functions by normalizing samples of color values from the image, and processing the color components of the color digital image by applying the color reproduction functions to the respective color components of the digital image. The samples of color values are selected from the digital image by operating on a luminance component of the digital color image with an image detail detection operator to detect regions of the image representing luminance detail, and operating on the color components of the digital image in the luminance detail regions with a contrast detection filter to detect the contrast of the color components of the image in the luminance detail regions. Thus, as Kwon does not disclose a compression or subtraction method of any kind, it cannot remedy the fundamental deficiencies of Thompson and Girod as applied to claims 4 and 5.

Claim 7

Claims 7 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Thompson and Girod as applied to claim 1 above, and further in view of Ransford et al. (U.S. Patent No. 5,490,221).

Claim 7 depends from, and incorporates all the limitations of, claim 1, and is therefore not obvious in view of Thompson and Girod for the same reasons as detailed above. Furthermore, Ransford does not remedy the deficiencies of Thompson and Girod. Ransford discloses a process for X-ray registration and differencing which results in more efficient compression. Specifically, differencing of a registered modeled subject image with a modeled reference image forms a differenced image for compression with conventional compression

algorithms. The disclosed registration process of the modeled subject image and modeled reference image translationally correlates such modeled images for resulting correlation thereof in spatial and spectral dimensions. Thus, Ransford does not involves subtraction and compression between a series of images, but rather subtraction between a subject image and a reference image (for example, the subtraction of the difference between a subject heart and a standard reference heart). It cannot therefore remedy the fundamental deficiencies of Thompson and Girod as applied to claim 7.

Claims 8 and 10-15

Claims 8 and 10-15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Thompson and Girod as applied to claim 1 above, and further in view of Cohen, M.S. "A data compression method for image time series," Human Brain Mapping, vol. 12 issue 1, pp. 20-24 (January 2001).

Claims 8 and 10-13 depend from, and incorporate all the limitations of, claim 1, and are therefore not obvious in view of Thompson and Girod for the same reasons as detailed above. Furthermore, the Examiner will note that the system claims 14 and 15 recite limitations substantially similar to claims 1 and 2. Thus, the reasoning provided above with regard to claim 1 (and 2) applies equally to claims 14 and 15. With regard to any of claims 8 and 10-15, Cohen does not remedy the deficiencies of Thompson and Girod. Cohen discloses an image compression algorithm wherein the value or corresponding pixels in subsequent images are subtracted from one another. Compression is achieved due to the fact that the subtracted values typically occupy only one byte per pixel versus the usual two bytes per pixel of an unaltered image. Nothing further with regard to compression or "noise reduction" is disclosed in Cohen. Thus, as Cohen does not disclose "adjusting the pixel value to zero for pixels of each of subtracted images 2 to n having absolute values of less than a predetermined threshold value; and compressing said subtracted images of said series 1 to n using a compression algorithm to form compressed images," Cohen does not remedy the fundamental deficiencies of Thompson and Girod as applied to claims 8 and 10-15.

Claim 9

Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Thompson, Girod, and Cohen as applied to claim 8 above, and further in view of Boutell et al. "PNG (Portable Network Graphics) Specification Version 1.0" RFC 2083 (1997).

Claims 9 depends from, and incorporate all the limitations of, claim 1, and is therefore not obvious in view of Thompson and Girod for the same reasons as detailed above. Furthermore, with regard to Cohen, Applicants incorporate by reference their discussion of this reference with regard to its inherent limitations and deficiencies (outlined in the discussion of claims 8 and 10-15, above). Boutell does not remedy these deficiencies. Boutell only discloses image compression in the Portable Network Graphics (PNG) format. There is no other disclosure related to any of the other limitations recited in claim 1, and the Examiner cites to Boutell specifically for the limited purpose of the PNG limitation recited in claim 9. Boutell cannot therefore remedy the fundamental deficiencies of Thompson, Girod, and Cohen as discussed above.

CONCLUSION

In view of the above remarks, Applicants submit that this application now stands in allowable form, and reconsideration and allowance are respectfully requested.

This response is being submitted on or before July 7, 2009, with the required fee of $555.00 for a 3-month extension of time, making this a timely response. It is believe that no additional fees are due in connection with this filing. However, the Commissioner is authorized to charge any additional fees, including extension fees or other relief which may be required, or credit any overpayment and notify us of same, to Deposit Account No. 04-1420.

Respectfully submitted,

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